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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,478	10/30/2003	Richard J. Pittaro	10020502-1	2712

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EXAMINER

KAPUSHOC, STEPHEN THOMAS

ART UNIT PAPER NUMBER

1634

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/699,478	Applicant(s) PITTARO ET AL.	
	Examiner Stephen Kapushoc	Art Unit 1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2006.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is written in reply to applicant's correspondence filed 1/31/06. Claims 13 and 14 have been amended. Claims 15-32 have been added. Claims 1-12 have been cancelled. Claims 13-32 are under examination. Applicant's amendments necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 13, 14, 16-22, and 25-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Chan (2002) US Patent 6,355,420.

Chan teaches a method for the analysis of polymers using a nanochannel that traverses a wall material (col.9 Ins.59-65), thus the channels are pores (col.71, Ins.13-26; col.72 Ins.1-5).

Regarding claims 13 and 14, Chan teaches a method using a wall material with a nanochannel (col.9 Ins.59-65), thus a substrate with a nanopore, and further teaches that a light emissive compound is attached to the external surface of the wall material adjacent to the channel (col.17 Ins.45-66) and that the light emissive compound may be an excitable molecule (col.26 Ins.23-43), thus providing a substrate having a having an excitable molecule adjacent to a nanopore. The reference further teaches identification of a unit of a polymer (such as a nucleic acid (col.10 Ins.57-64)), which is nanoscale

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moiety, by transiently exposing (col.22 Ins.50-65) the unit to a fluorescence excitation source (col.9 Ins.39-50; Figs 8 and 9) and detecting a generated signal which may be generated by a quenching reaction (col.14 Ins.21-29). The reference further teaches that the biopolymer may be labeled with a quencher (col.16 Ins.1-6; col.25 Ins.37-47), and that the quencher molecule may be different from the nanoscale moiety (col.28 Ins.35-64; col.54 In.54 – col.55 In.9). Relevant to step b of claim 14, Chan teaches the excitation of the light emissive compound (col. 26 Ins.30-40; col.28 Ins.40-50).

Regarding claims 16-18, Chan teaches the analysis of DNA (col.55 Ins.10-12), which is a polynucleotide and a biopolymer.

Regarding claim 19, Chan teaches a nanochannels with diameters of 1.7 - 3 nm (col. 78 Ins.57-64), thus the nanopore is from 1 nanometer to 10 nanometers in diameter.

Regarding claim 20, Chan teaches the use of BODIPY (col 26. Ins.13-14), which is a chromophore.

Regarding claim 21, Chan teaches the use of fluorophores (col.26 In.32).

Regarding claim 22, Chan teaches the use of fluorescein (col.26 In.11).

Regarding claims 25-27, Chan teaches the analysis of DNA (col.55 Ins.10-12), which is a polynucleotide and a biopolymer.

Regarding claim 28, Chan teaches a nanochannels with diameters of 1.7 - 3 nm (col. 78 Ins.57-64), thus the nanopore is from 1 nanometer to 10 nanometers in diameter.

Regarding claim 29, Chan teaches the use of BODIPY (col 26. Ins.13-14), which is a chromophore.

Regarding claim 30, Chan teaches the use of fluorophores (col.26 In.32).

Regarding claim 31, Chan teaches the use of fluorescein (col.26 In.11).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan (2002) US Patent 6,355,420 in view of Russell (WO 01/18247) (As cited in the previous office action).

Chan teaches a method for the analysis of polymers using a nanochannel that traverses a wall material (col.9 Ins.59-65), thus the channels are pores (col.71, Ins.13-26; col.72 Ins.1-5). Chan teaches a method using a wall material with a nanochannel (col.9 Ins.59-65), thus a substrate with a nanopore, and further teaches that a light emissive compound is attached to the external surface of the wall material adjacent to the channel (col.17 Ins.45-66) and that the light emissive compound may be an excitable molecule (col.26 Ins.23-43), thus providing a substrate having an excitable molecule adjacent to a nanopore. The reference further teaches identification of a unit of a polymer (such as a nucleic acid (col.10 Ins.57-64)), which is nanoscale moiety, by

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transiently exposing (col.22 Ins.50-65) the unit to a fluorescence excitation source (col.9 Ins.39-50; Figs 8 and 9) and detecting a generated signal which may be generated by a quenching reaction (col.14 Ins.21-29). The reference further teaches that the biopolymer may be labeled with a quencher (col.16 Ins.1-6; col.25 Ins.37-47), and that the quencher molecule may be different from the nanoscale moiety (col.28 Ins.35-64; col.54 ln.54 – col.55 ln.9). Chan teaches the excitation of the light emissive compound (col. 26 Ins.30-40; col.28 Ins.40-50). Thus Chan teaches the methods of claims 13 and 14, from which the rejected claims depend/

Chan does not teach the use of excitable molecules that are quantum dots.

Russell teaches a method for analyzing polymers using a nanopore structure with an optical agent, which is an excitable molecule, that is quenched by exposure to the polymer (p. 4 – optical agent; Figs 1 and 2; p.39 – Synthetic pore). Russell specifically teaches the use of quantum dots as optical agents (p.16).

It would have been prima facie obvious to one of skill in the art at the time the invention was made to have modified the method of Chan so as to have incorporated the quantum dot excitable molecules of Russell. One would have been motivated to do so based on the teaching of Russell that quantum dots are preferred fluorescent compounds that have longer photostability half lifes (p.16).

Thus in view of the prior art the claimed invention is prima facie obvious.

6. Claims 23 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan (2002) US Patent 6,355,420 in view of Mely et al (1997).

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The teachings of Chan are applied to claims 23 and 32 as they were previously applied to claims 15 and 24. Additionally, Chan teaches that different quenchers can be selected based on factors such as the type of agent (i.e. excitable molecule) and polymer being analyzed.

Chan does not teach the use of potassium iodide or acrylamide as quenchers.

Regarding claims 15 and 24, Mely et al teaches an analysis using fluorescence quenching (p.15625 – Steady-state and time-resolved fluorescence). The reference specifically teaches the use of potassium iodide and acrylamide as quenchers (p.15624 – Abstract; p.15625, right col., first full para).

It would have been prima facie obvious to one of skill in the art at the time the invention was made to have modified the method of Chan so as to have incorporated the potassium iodide or acrylamide as quenchers of Mely et al. One would have been motivated to do so based on the teaching of Mely et al that potassium iodide and acrylamide are suitable for the successful quenching of an excitable molecule (i.e. Trp residues) (p.15625 – Absorption spectra; p.15626, left col., last para).

Thus in view of the prior art the claimed invention is prima facie obvious.

Response to Remarks

Formal matters

Applicant has cancelled claims 1-12. Claims 13 and 14 have been amended, and new claims 15-32 have been added. Basis for the amendments and new claims is found in the specification and previous claims.

Restriction Requirement

Applicants confirm the election of the invention of Group II. Applicant's telephonic election of Group II, noted in the office action of 11/01/2005, was made with traverse. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Objections

Applicants have amended the Abstract to create a single paragraph, thus the previous objection to the Abstract is withdrawn. Applicants have amended the claims to remove the phrase 'to quench the quencher molecule', thus the previous objection to the Specification is withdrawn.

Rejections under 112, second paragraph

Applicants have amended claim 14 to replace the phrase 'to quench the quencher molecule' with the phrase 'to quench the excitable molecule', thus the previous rejection of claim 14 is withdrawn.

Rejections under 112, first paragraph

Applicants have amended claim 14 to replace the phrase 'to quench the quencher molecule' with the phrase 'to quench the excitable molecule', thus the previous rejection of claim 14 is withdrawn.

Rejections under 102

Applicants have amended claim 13 to include the limitation 'wherein the quencher molecule is different from the nanoscale moiety'. This limitation is not specifically taught by Russell (WO 01/18247), thus the previous rejection of claim 13 is withdrawn.

Conclusion

No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

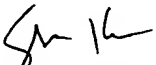
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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Kapushoc whose telephone number is 571-272-3312. The examiner can normally be reached on Monday through Friday, from 8am until 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached at 571-272-0745. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Stephen Kapushoc
Art Unit 1634


JULIET C. SWITZER
PRIMARY EXAMINER
4/2/06